

*Williams*®

16P-3002-103  
December, 1981

# STARGATE

## DRAWING SET



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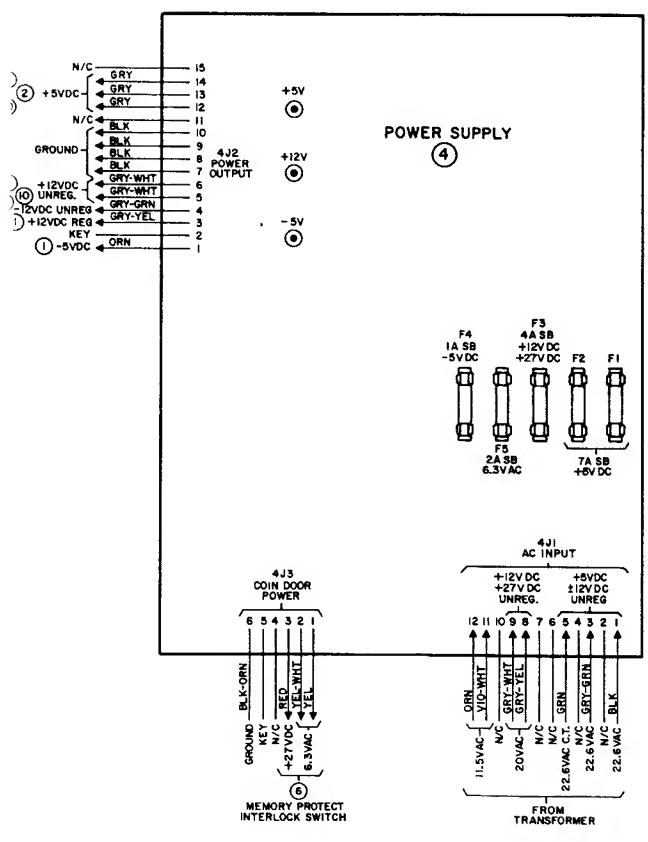
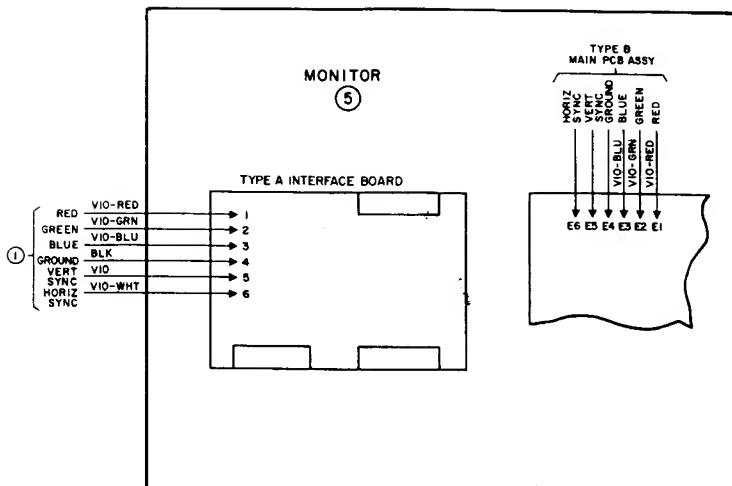
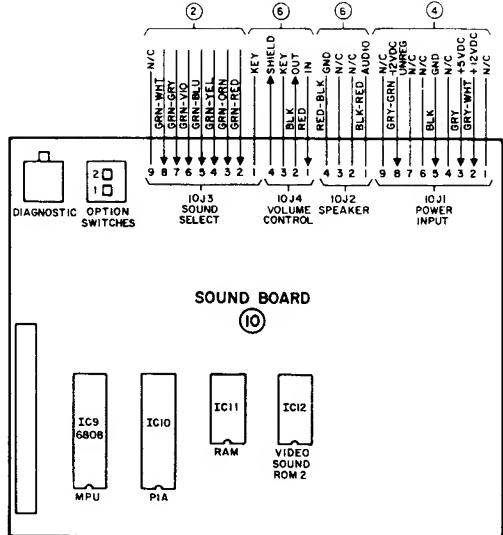
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*Williams*®   
ELECTRONICS, INC.

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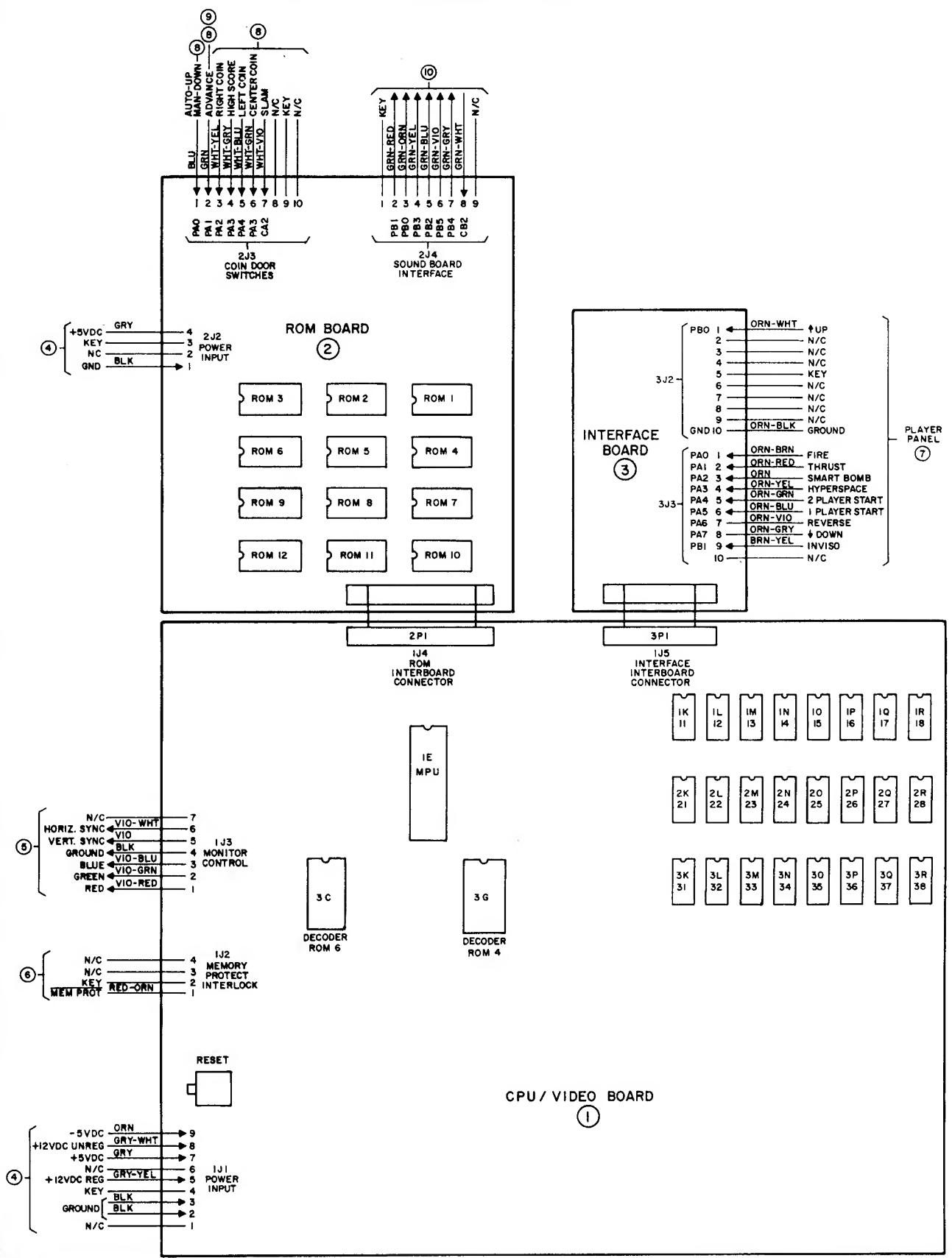
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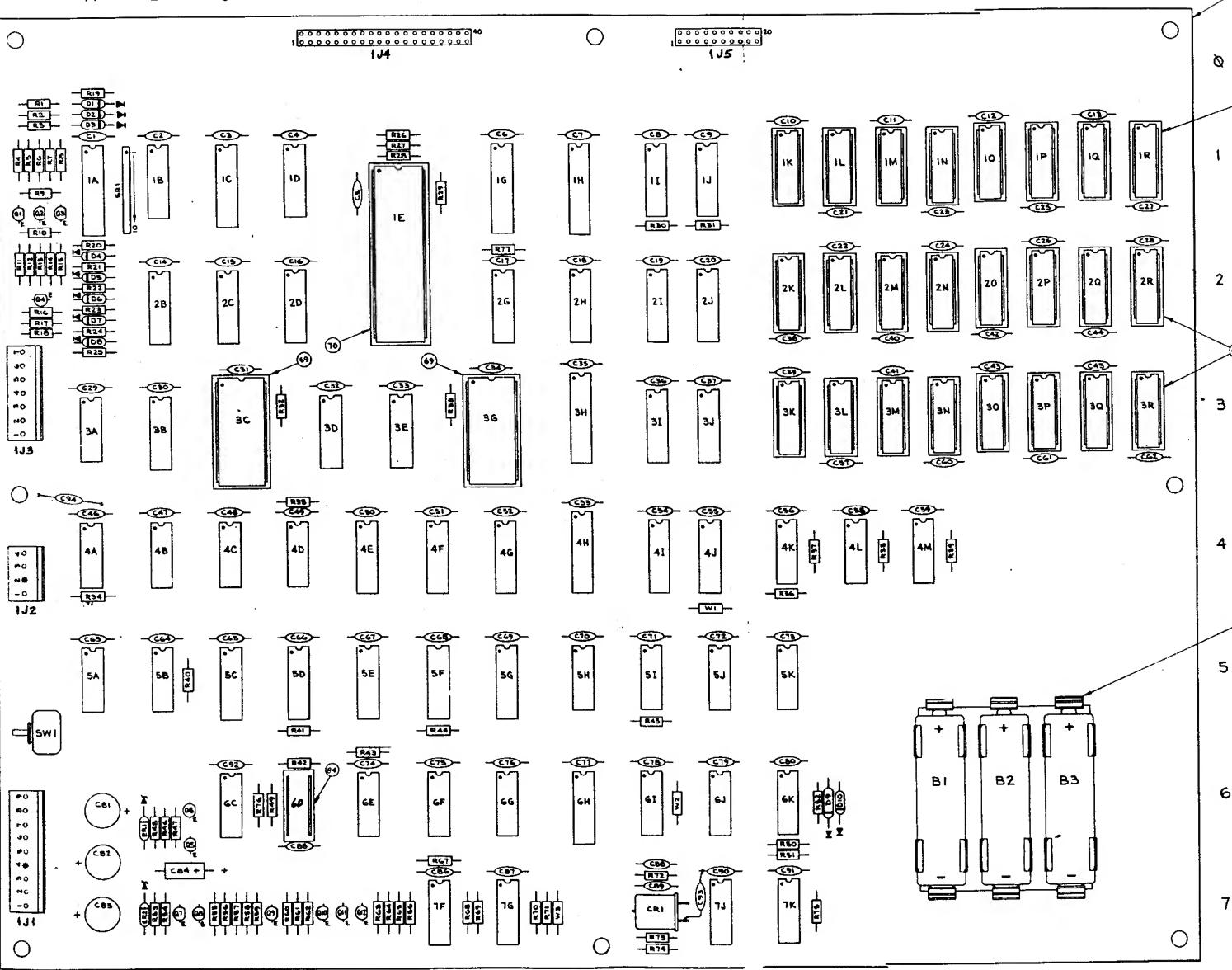


- (1) CPU/VIDEO BOARD
- (2) ROM BOARD
- (3) INTERFACE BOARD
- (4) POWER SUPPLY
- (5) MONITOR
- (6) CABINET
- (7) PLAYER PANEL
- (8) COIN DOOR
- (9) CASH BOX
- (10) SOUND BOARD

# COMPONENT DOOR

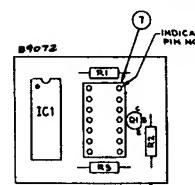


O Q U Z M L K J I H G F E D C B A



**B9072 BILL OF MATERIAL**

ITEM NO.	PART NO.	PART DESIGNATION	DESCRIPTION	READY NO.
1	S170-0000-00		BARE P.C. BOARD	I
2	S280-0001-00	IC1	7410 TRIPLE 3-INPUT NAND	I
3	S160-0098B-00	Q1	2N4401, TO-92 TRANSISTOR, NPN	I
4	Q1358-00	R1	1 K $\Omega$ x 5% 1/4 WATT	I
5	S010-00991-00	R2	RESISTOR, C.P. 4.7 K $\Omega$ x 5% 1/4 WATT	I
6	S010-00944-00	R3	RESISTOR, C.P. 10 K $\Omega$ x 5% 1/4 WATT	I
7	S701-0012-00		14 PIN I.C. HEADER	I



BILL OF MATERIAL					ITEM NO.	PART NO.	PART DESIGNATION	DESCRIPTION	REQ'D. NO.
1	5170-09656-00		BARE P.C. BOARD REV. A		49	5010-09001-00	R2, R21, R24	RESISTOR, C.F. 330 OHM 5% 1/4 W.	3
2	5280-09073-00	4B	7400 QUAD 2-INPUT NAND	1	50	5010-09039-00	R56	RESISTOR, C.F. 10 OHM 5% 1/4 W.	1
3	5280-08948-00	5H	7402 QUAD 2-INPUT NOR	1	51	5043-09491-00	C89, C93	CAPACITOR, AXIAL 22 PFD. 1K V. ±10%	2
4	5281-09215-00	7J	74LS04 HEX. INVERTER	1	52	5043-09492-00	C88	CAPACITOR, AXIAL 100 PFD. 50 V. ±10%	1
5	5280-09013-00	5A, 5K	7404 HEX. INVERTER	2	53	5040-09545-00	C84	CAPACITOR, AXIAL 22 MFD. 10 V. ±20%	1
6	5280-08973-00	6F	7408 QUAD AND	1	54	5043-09065-00	C94	CAPACITOR, AXIAL 470 PFD. 50 V. XTR ±20%	1
7	5280-09011-00	4L, 4M, 6I	7410 TRIPLE 3-INPUT NAND	3	55	5043-09996-00	SEE NOTE #3	CAPACITOR, AXIAL .1 MFD. 50 V. ±20%	86
8	5280-09475-00	3A, GJ	7411 TRIPLE 3-INPUT AND	2	56	5040-09421-00	C81, C82, C83	CAPACITOR, RADIAL 100 MFD. 25V. ±50-10%	3
9	5280-09530-00	5B	7420 DUAL 4-INPUT NAND	1	57	5075-09059-00	ZR2	IN5990A 3.9 V. ZENER DIODE	1
10	5280-09416-00	4C	7421 DUAL 4-INPUT AND	1	58	5075-09018-00	ZR1	IN5996A 6.8V. ZENER DIODE	1
11	5280-09477-00	6E, GG	7432 QUAD 2-INPUT OR	2	59	5070-08919-00	D1, D2, D3, D4, D5, D6, D7, DB	IN4148 DIODE, SILICON	2
12	5280-09478-00	4D, 4K, GK 6C, 7F, 7G	7474 DUAL-D TYPE FLIP-FLOP	6	60	5070-09266-00	D9	IN5817 DIODE, SILICON	1
13	5280-09479-00	4A, SJ	7486 QUAD 2-INPUT EX-OR	2	61	5160-09388-00	Q5, Q6, Q7, Q8, Q9, Q10, Q11	2N4401, TO-92 TRANSISTOR, NPN	7
14	5281-09480-00	7K	74LS107 DUAL J-K FLIP-FLOP	1	62	5190-09016-00	Q1, Q2, Q3, Q4, Q12	2N4403, TO-92 TRANSISTOR, PNP	5
15	5281-09582-00	5G	74LS133 13-INPUT NAND	1	63	5520-09495-00	CRI	12 MHZ CRYSTAL	1
16	5281-09246-00	4G, GH	74LS139 DUAL 2-to-4 LINE DECODER	2	64				
17	5280-09481-00	3D, 3E, 4E, 4F	74153 DUAL 4-to-1 DATA INVERT	4	65	5880-09022-00	B1, B2, B3	BATTERY ALKALINE 1.5 V. (AA)	3
18	5280-09668-00	1I, 1J, 2I, 2J 3I, 3J, 4I, 4J	74166 8-BIT SHIFT REGISTER	8	66	5881-09021-00		BATTERY HOLDER #171	1
19					67	5100-09628-00		14-PIN IC SOCKET	0
20	5281-09308-00	1G	74LS245 OCTAL BUSTRANSCEIVER	1	68	5100-09006-00		16-PIN IC SOCKET	24
21	5281-09485-00	2G, 2H	74LS257 QUAD DATA MULPX.	2	69	5100-09004-00		24-PIN IC SOCKET	2
22	5370-08989-00	1D, 2D, 2G, 3B	BT97 HEX. TS BUFFER	0	70	5100-08985-00		40-PIN IC SOCKET	1
	5281-09385-00		74LS367 HEX BUS DRIVER	4	71	5791-09437-00	IJ6	20 PIN RIBBON CABLE HEADER	1
23	5281-09466-00	1A, 1H, 3H, 4H	74LS374 OCTAL D-TYPE FLIP-FLOP	4	72	5791-09549-00	IJ4	40 PIN RIBBON CABLE HEADER	1
24	A-5342-09695	3C	UNIVERSAL VERT. DECODER ROMS	1	73	5791-09028-00	IJ2	4 PIN HEADER 09-65-1041	1
25	A-5342-09694	3G	UNIVERSAL HORIZ. DECODER ROM 4	1	74	5791-09497-00	IJ3	7 PIN HEADER 09-65-1071	1
26	B-9072	6D	CMOS MOD. 666Y BOARD	1	75	5791-09027-00	IJ1	9 PIN HEADER 09-65-1091	1
27	5281-09533-00	5I	74LS393 DUAL 4-BIT BIN.COUNTER	1	76	5019-09669-00	SR1	RESISTOR, 1 K OHM 10 PIN SIP	1
28	5340-09488-00	SEE NOTE #1	4116 (450 ns ACCESS) 16K x 1 DYNAMIC RAM	24	77	5010-09534-00	W1, W2, W3	RESISTOR, C.F. 0 OHM 1/4 WATT	3
29	5070-06258-00	DIO	IN4001 DIODE	1	78	5340-09689-00		5114 1KX4 CMOS STATIC RAM	1
30	5280-09489-00	5C, 5D, 5E, 5F	9316 4-BIT BIN. COUNTER	4		5340-09667-00		5114 1KX4 CMOS STATIC RAM	0
31	5400-09490-00	IE	6809 E MICROPROCESSOR	1	79	5281-09488-00 5280-09628-00 5281-09716-00 5281-09717-00	1B, 2B	14LS169 16X4 RAM 74887 16X4 RAM 74S187 16X4 RAM 74LS289 16X4 RAM 74S289 16X4 RAM	0 0 0 0 0
32	5010-09548-00	R10, R12, R14	RESISTOR, C.F. 1.6 OHM 2% 1/4 W.	3	80	5641-09371-00 5641-09312-00	SW1	PUSH BUTTON SW. SPST	0
33	5010-09036-00	R65	RESISTOR, C.F. 100 OHM 5% 1/4 W.	1			PUSH BUTTON SW. DPDT MOM.	1	
34	5010-09187-00	R4, R6, R7, R16, R19, R25	RESISTOR, C.F. 150 OHM 5% 1/4 W.	6	81				
35	5010-09508-00	R11, R13, R15	RESISTOR, C.F. 270 OHM 2% 1/4 W.	3	82				
36	5010-09416-00	R18	RESISTOR, C.F. 470 OHM 5% 1/4 W.	1	83				
37	5010-08992-00	R1, R20, R23	RESISTOR, C.F. 560 OHM 5% 1/4 W.	3	84	5700-09813-00		14 PIN IC SOCKET	1
38	5010-09358-00	R5, R8, R9, R17, R48, R54, R74	RESISTOR, C.F. 1 K OHM 5% 1/4 W.	7					
39	5010-09314-00	R3, R22	RESISTOR, C.F. 1.2 K OHM 5% 1/4 W.	2					
40	5010-08998-00	R69, R72, R73	RESISTOR, C.F. 2.2 K OHM 5% 1/4 W.	3					
41	5010-08997-00	R60, R63	RESISTOR, C.F. 2.7 K OHM 5% 1/4 W.	2					
42	5010-08983-00	R30, R31 R40, R44, R58	RESISTOR, C.F. 3.3 K OHM 5% 1/4 W.	5					
43	5010-08991-00	SEE NOTE #2	RESISTOR, C.F. 4.7 K OHM 5% 1/4 W.	27					
44	5010-09034-00	R46, R53	RESISTOR, C.F. 10 K OHM 5% 1/4 W.	2					
45	5010-08774-00	R47, R55, R57, R62	RESISTOR, C.F. 22 K OHM 5% 1/4 W.	4					
46	5010-09113-00	R61	RESISTOR, C.F. 33 K OHM 5% 1/4 W.	1					
47	5010-09359-00	R64	RESISTOR, C.F. 47 K OHM 5% 1/4 W.	1					
48	5010-09442-00	R42, R49	RESISTOR, C.F. 330 K OHM 5% 1/4 W.	2					

#### NOTES:

1. 4116: 1K, 1L, 1M, 1N, 1O, 1P, 1Q, 1R,  
2K, 2L, 2M, 2N, 2O, 2P, 2Q, 2R,

3K, 3L, 3M, 3N, 3O, 3P, 3Q, 3R

#### 2. 47K Δ RESISTOR:

R26, R27, R28, R29, R32, R33, R35,  
R36, R37, R38, R39, R41, R43, R45,

R50, R51, R52, R66 R67 R68, R69,

R70, R71, R75, R84, R76 R77

R26, R27, R28, R29, R32, R33, R35,  
R36, R37, R38, R39, R41, R43, R45,

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R70, R71, R75, R84, R76 R77

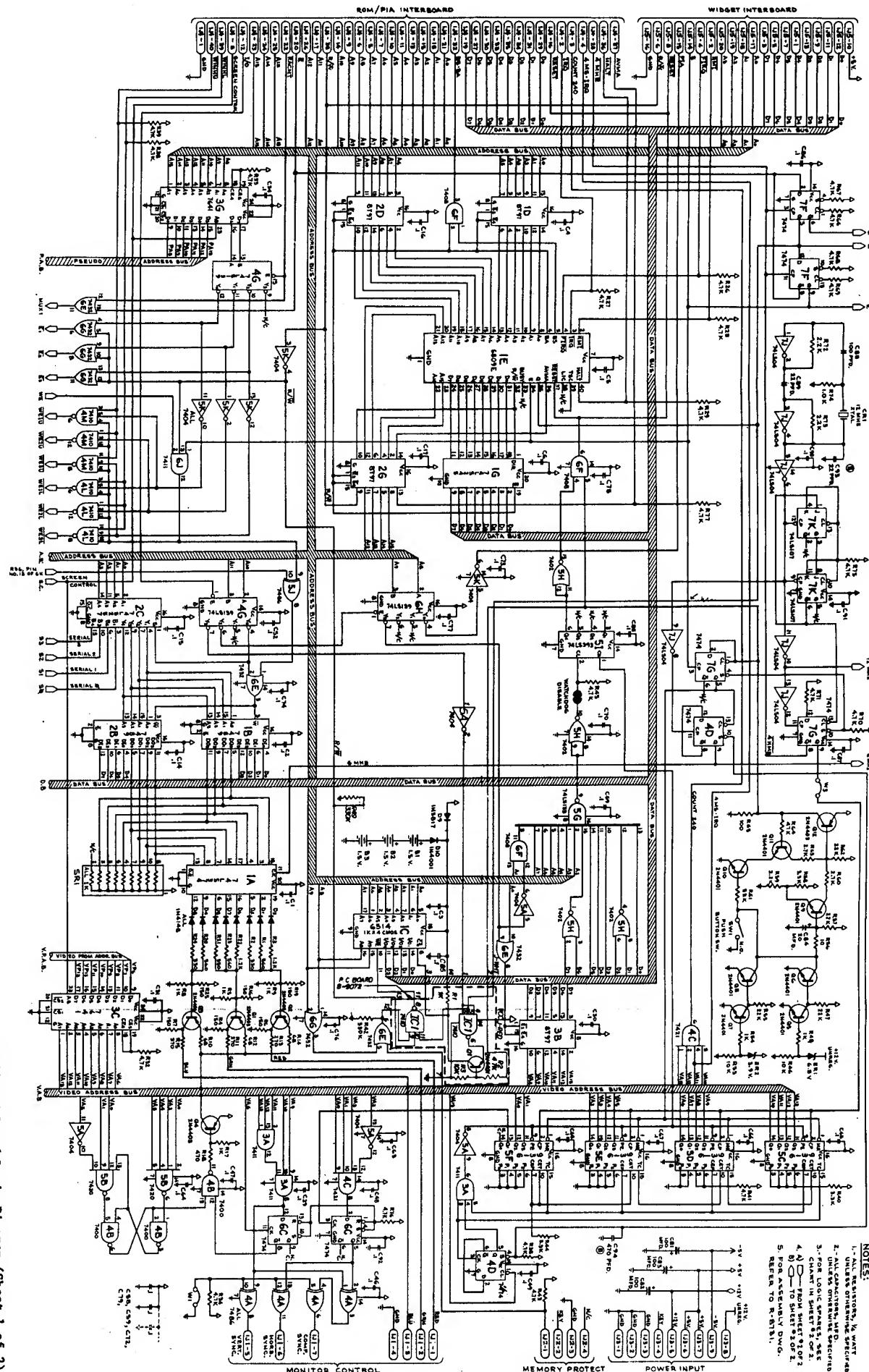
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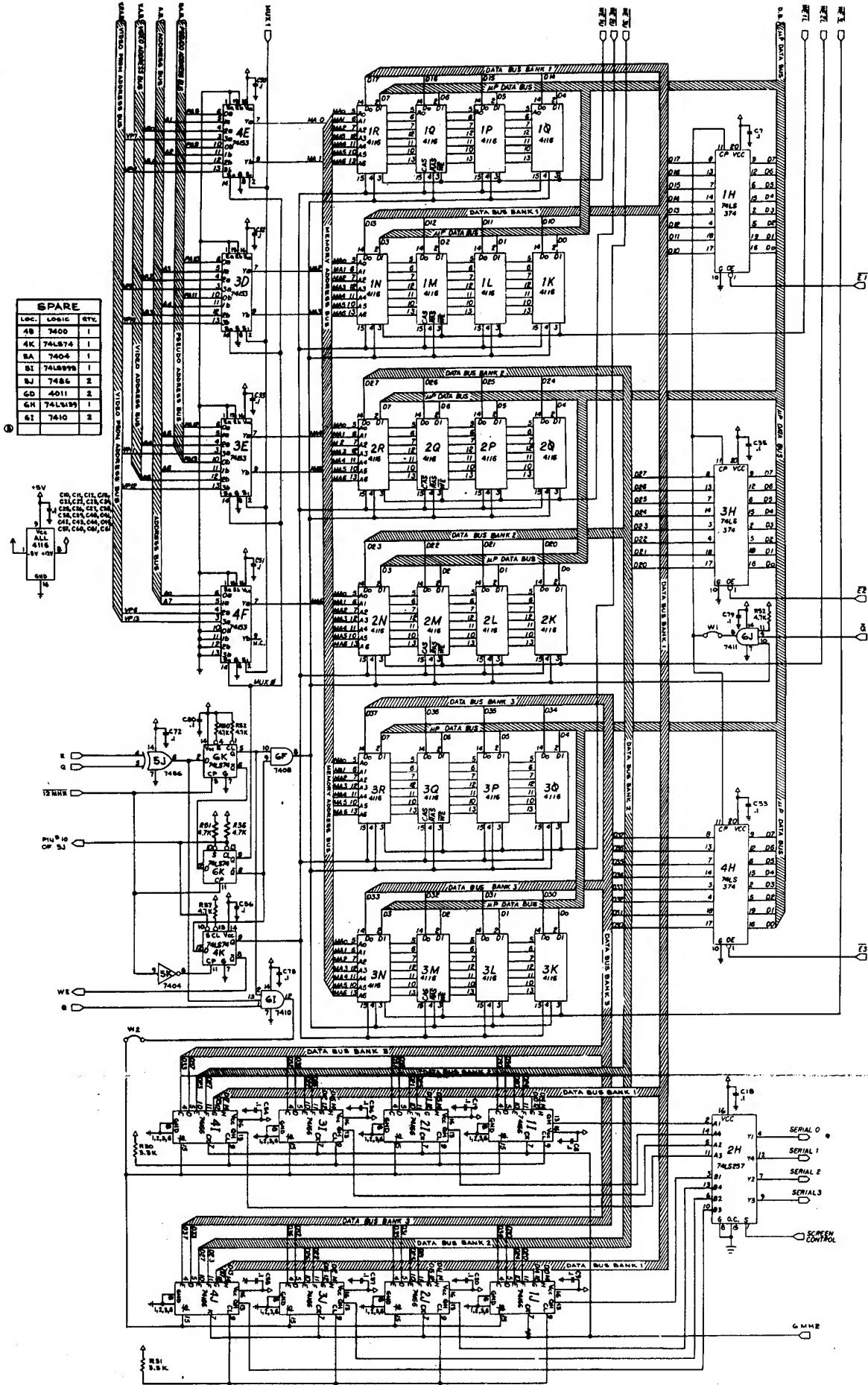
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R50, R51, R52, R66 R67 R68, R69,

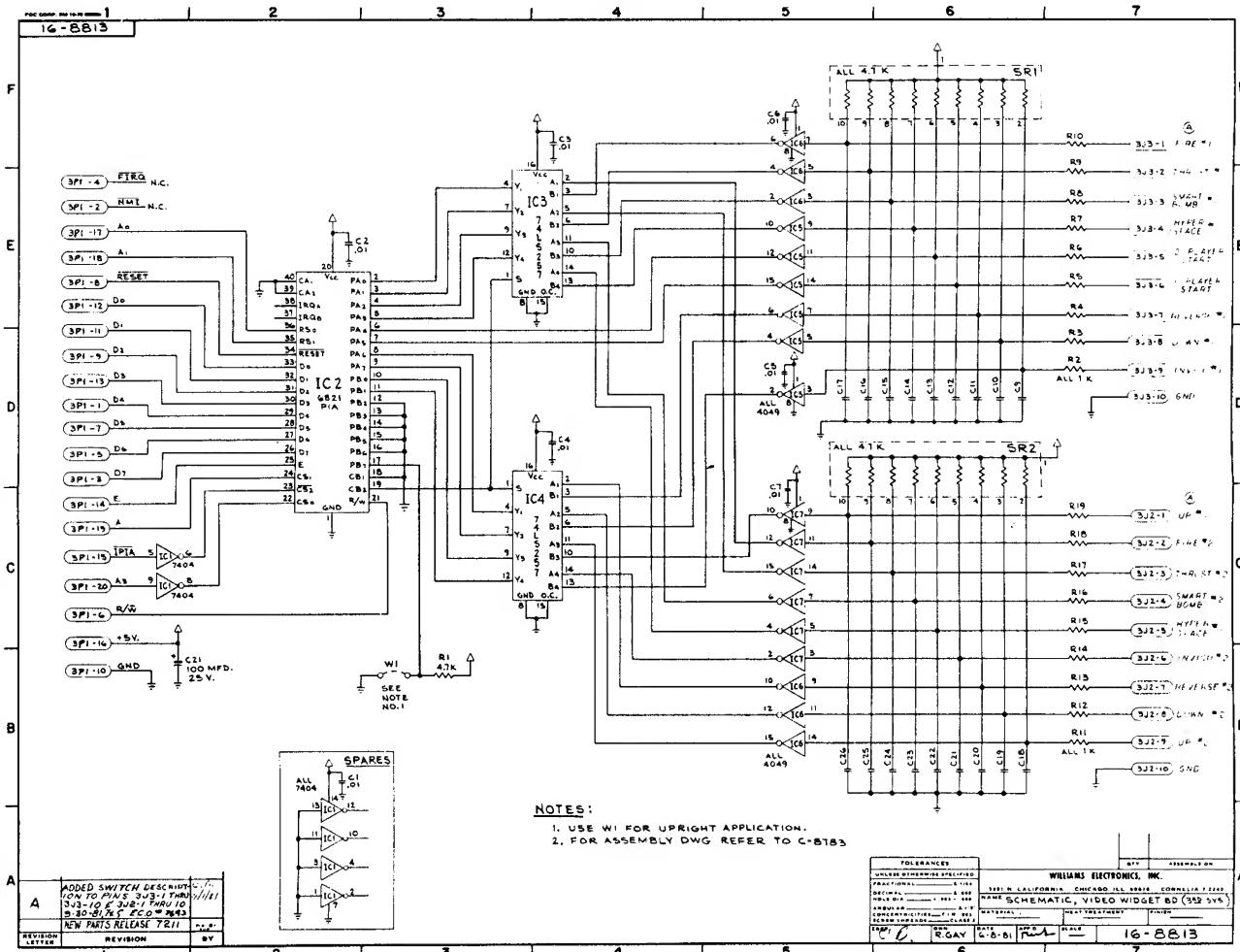
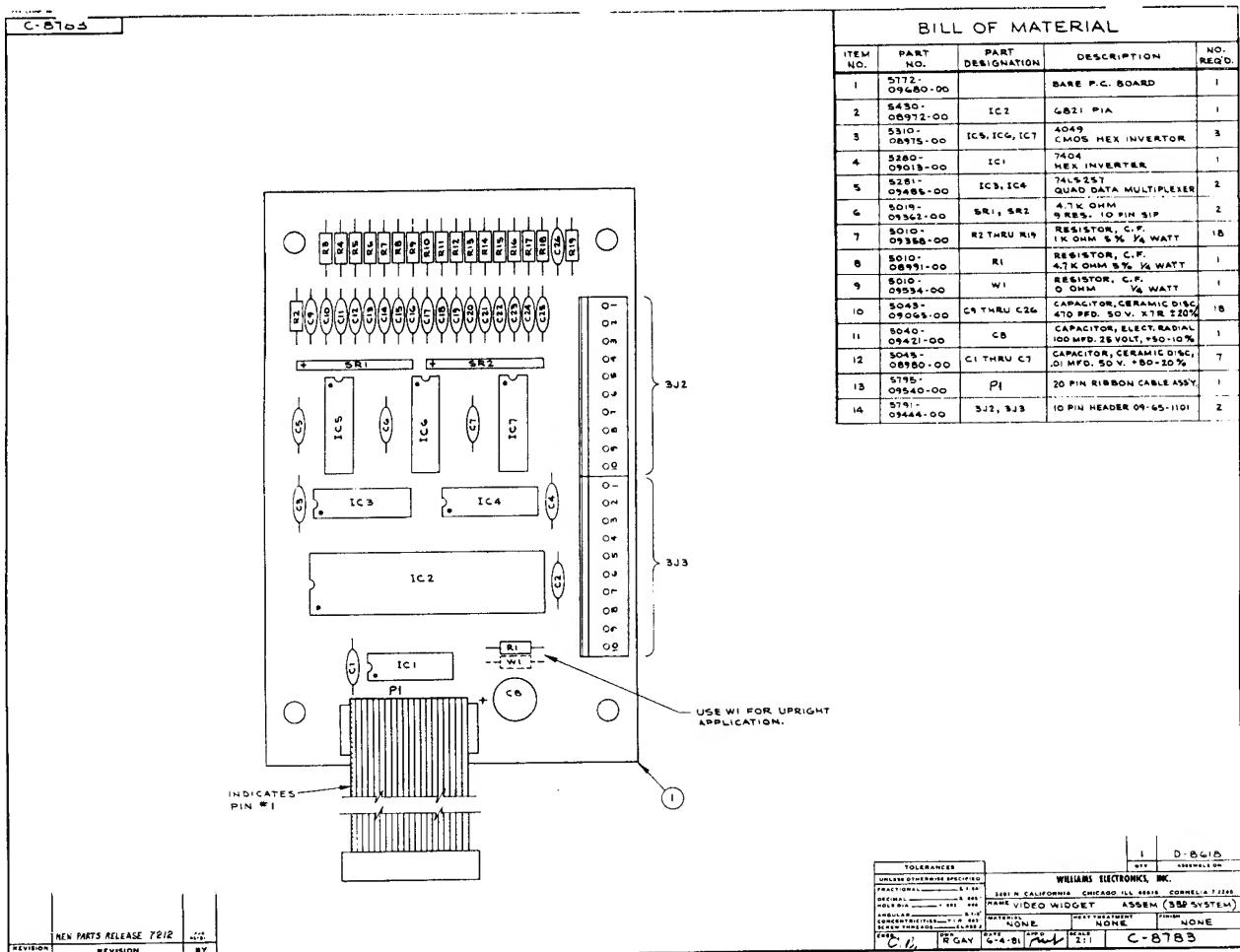


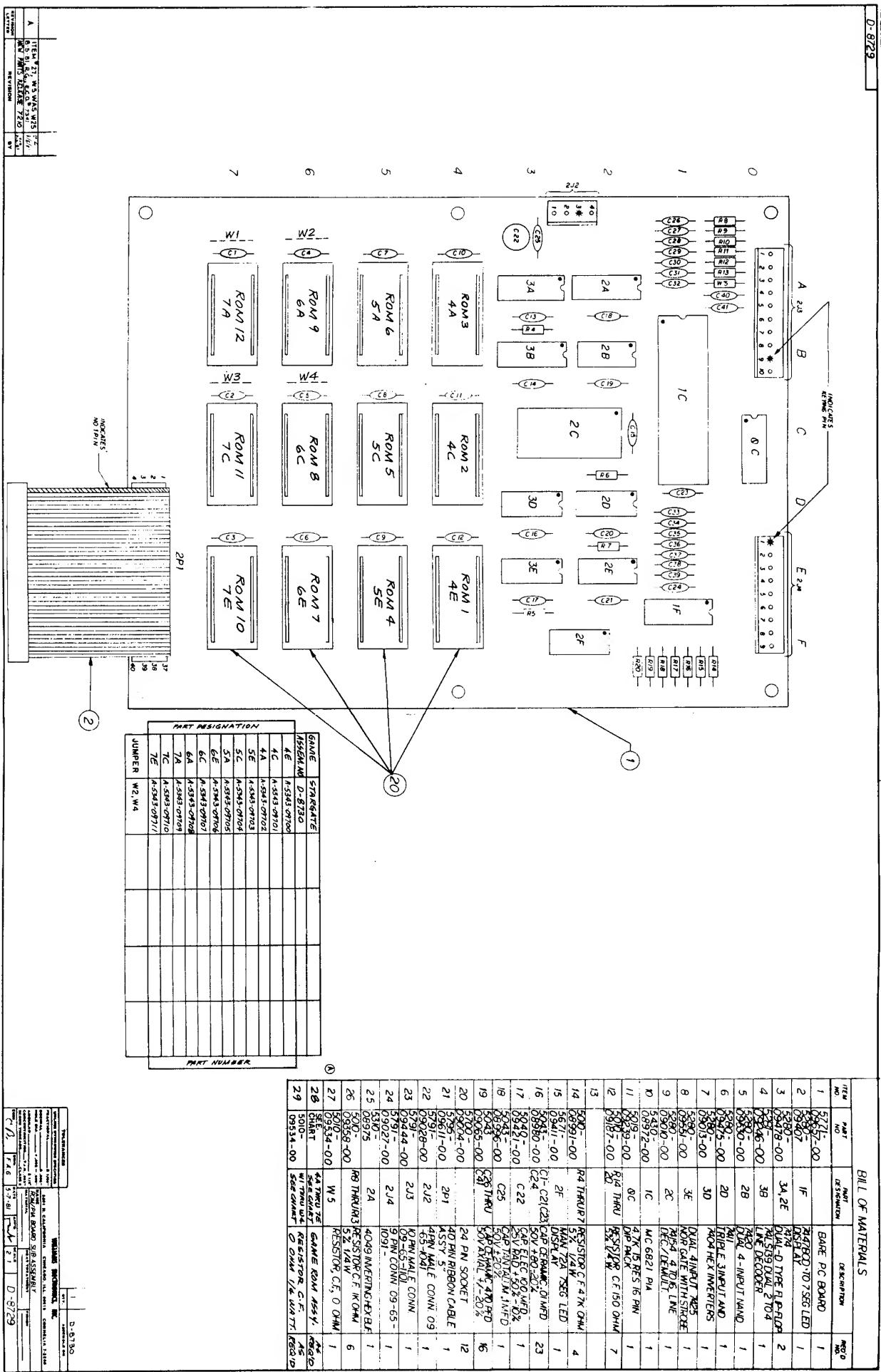
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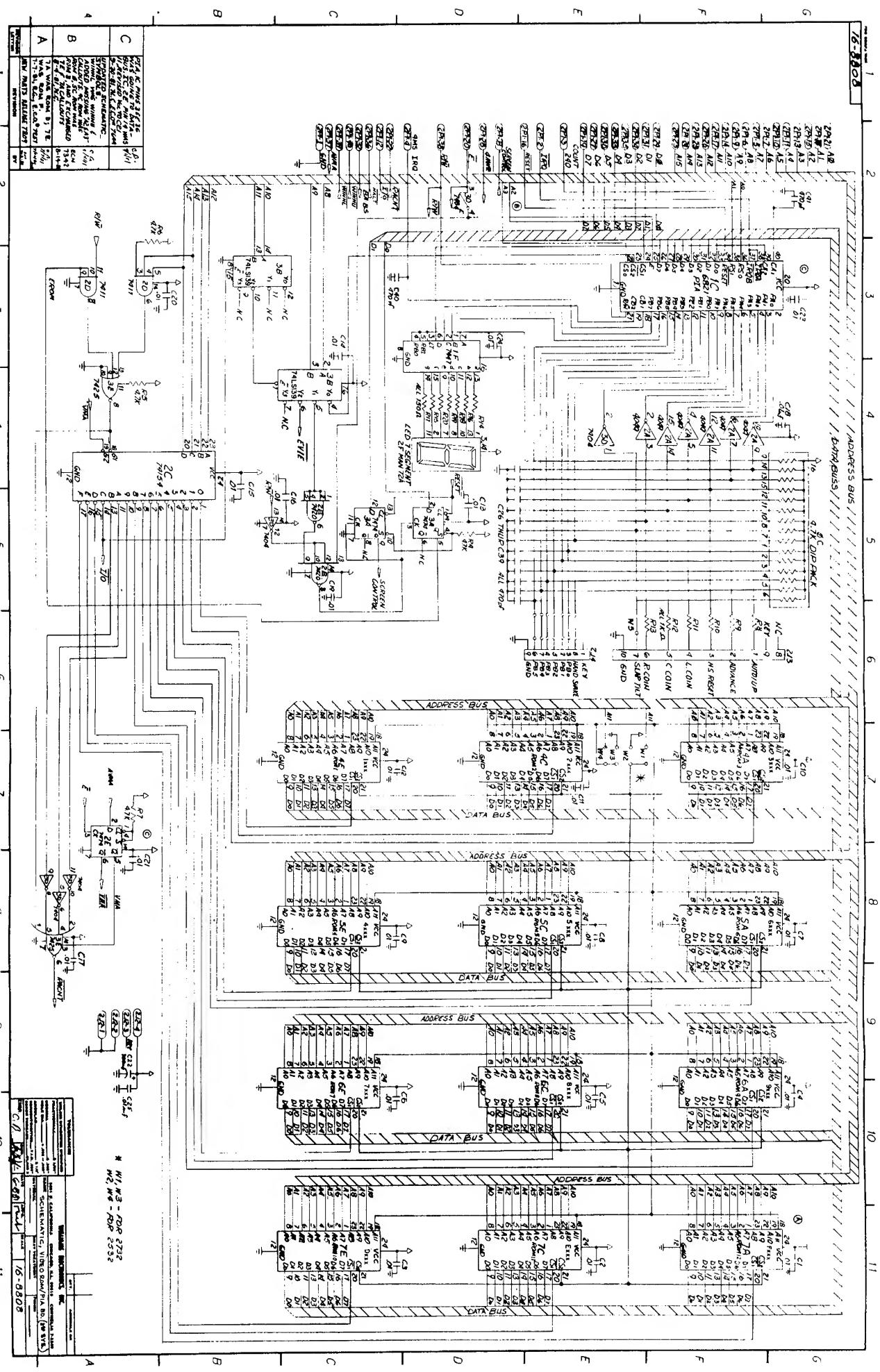
1. - ALL RESISTORS,  $\frac{1}{4}$  WATT  
UNLESS OTHERWISE SPECIFIED

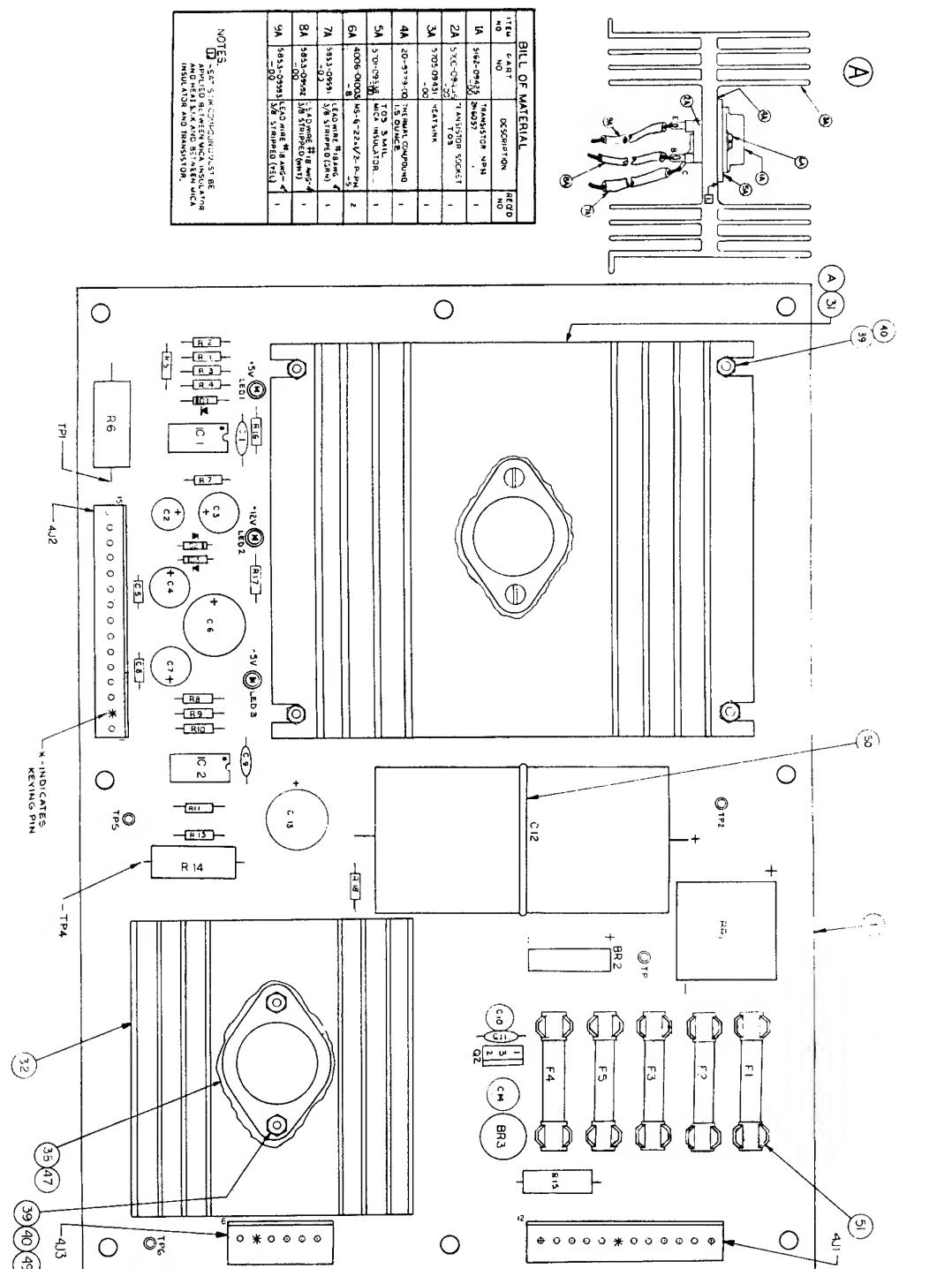


R8948 CPU Board Logic Diagram (Sheet 2 of 2)

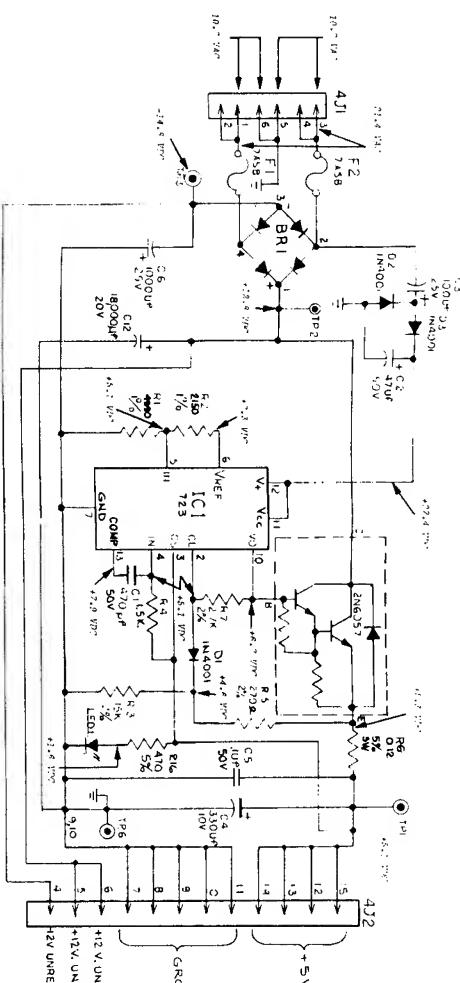
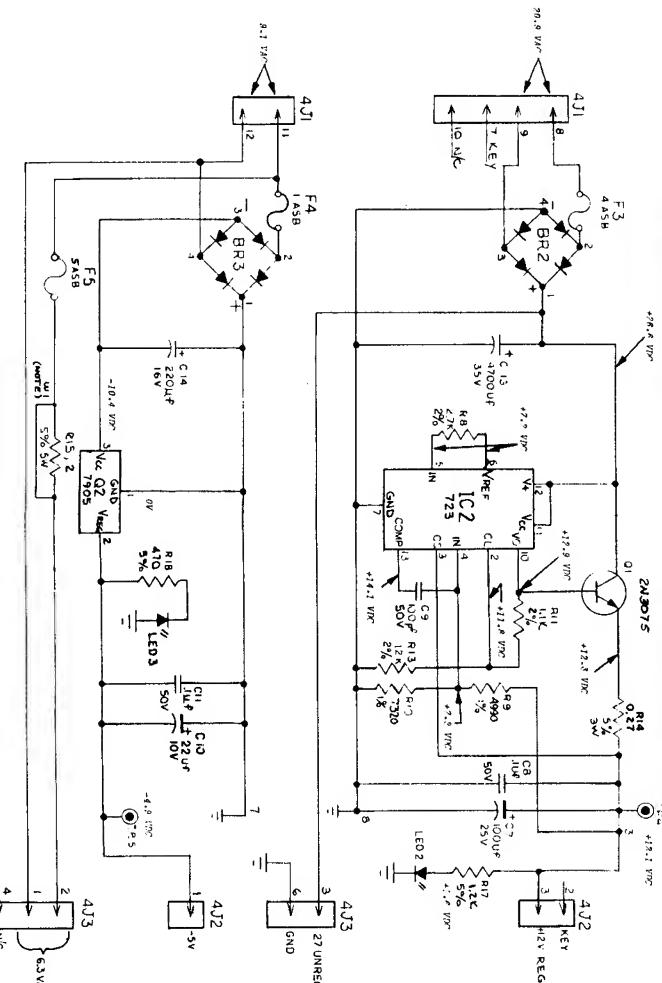
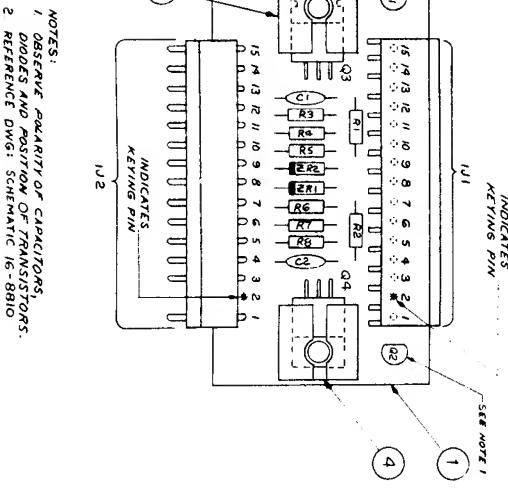
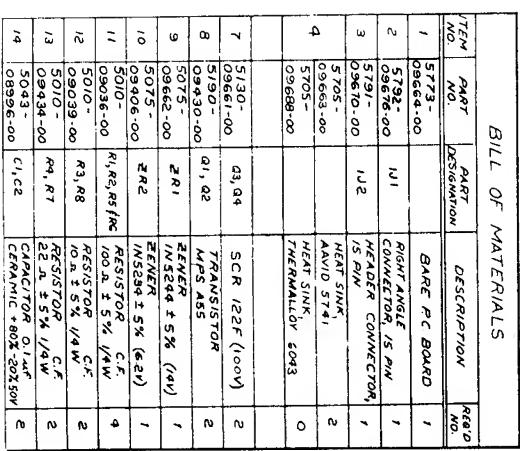
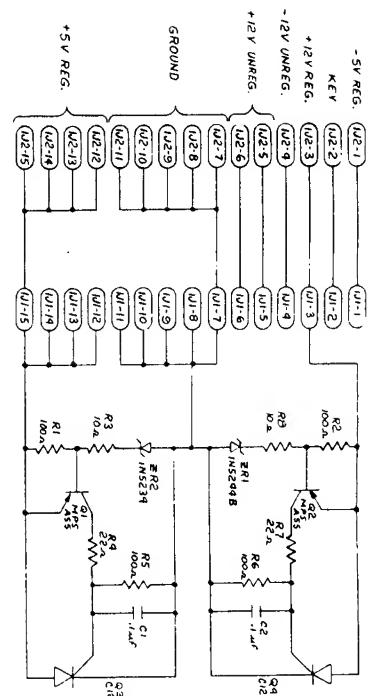






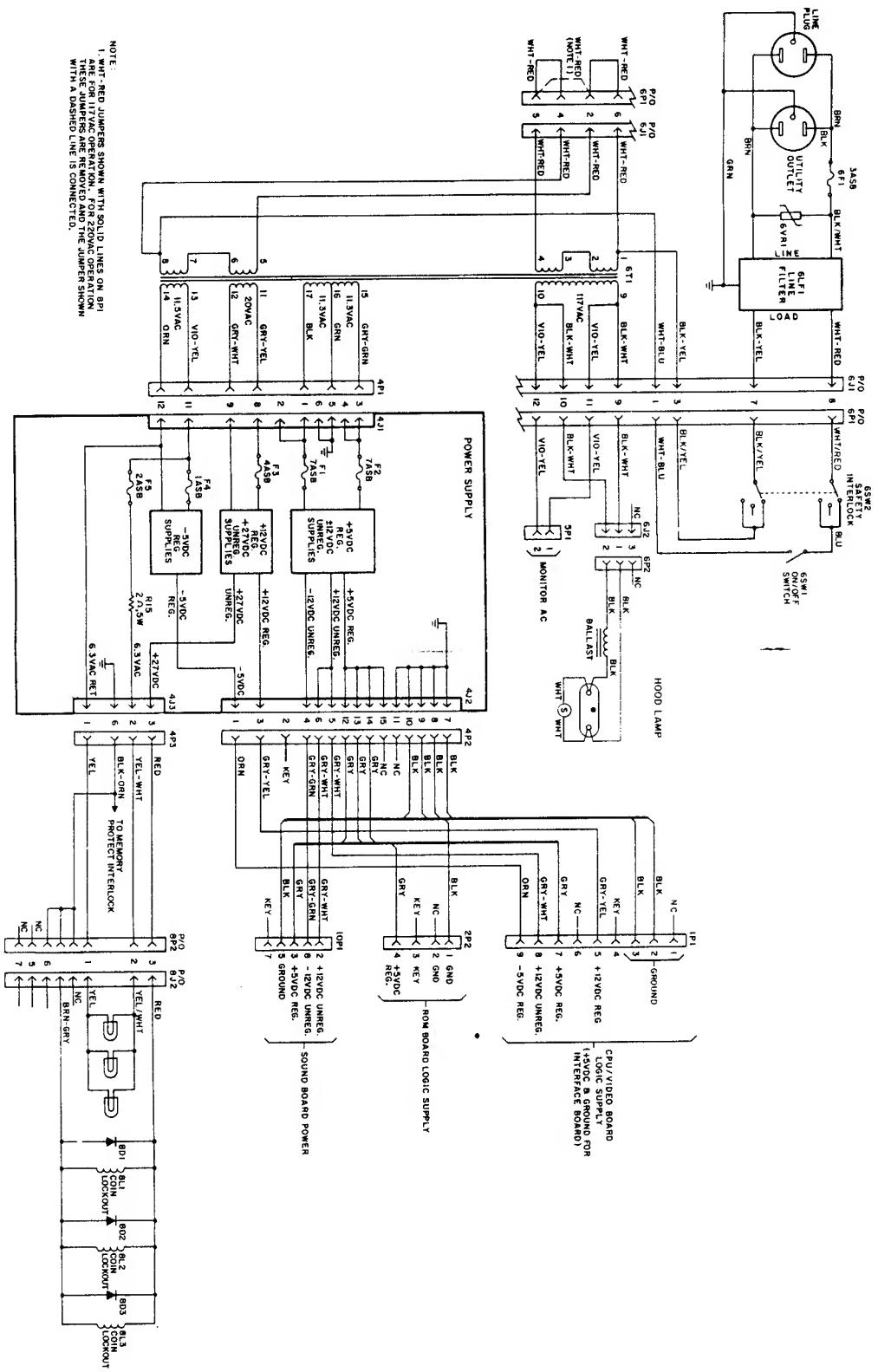


BILL OF MATERIAL					
ITEM	PART NO.	DESCRIPTION	QUANTITY	RECD	BY
1	S113-00514-00	PC BOARD	1		
2	S002-00055-00	RESISTOR, 5K OHM	2		
3	S002-00054-00	RESISTOR, 5K OHM	2		
4	S002-00056-00	RESISTOR, 5K OHM	1		
5	S002-00057-00	RESISTOR, 5K OHM	1		
6	S002-00058-00	RESISTOR, 5K OHM	1		
7	S002-00059-00	RESISTOR, 5K OHM	1		
8	S002-00060-00	RESISTOR, 5K OHM	1		
9	S002-00061-00	RESISTOR, 5K OHM	1		
10	S002-00062-00	RESISTOR, 5K OHM	1		
11	S002-00063-00	RESISTOR, 5K OHM	1		
12	S002-00064-00	RESISTOR, 5K OHM	1		
13	S002-00065-00	RESISTOR, 5K OHM	1		
14	S002-00066-00	RESISTOR, 5K OHM	1		
15	S002-00067-00	RESISTOR, 5K OHM	1		
16	S002-00068-00	RESISTOR, 5K OHM	1		
17	S002-00069-00	RESISTOR, 5K OHM	1		
18	S002-00070-00	RESISTOR, 5K OHM	1		
19	S002-00071-00	RESISTOR, 5K OHM	1		
20	S002-00072-00	RESISTOR, 5K OHM	1		
21	S002-00073-00	RESISTOR, 5K OHM	1		
22	S002-00074-00	RESISTOR, 5K OHM	1		
23	S002-00075-00	RESISTOR, 5K OHM	1		
24	S002-00076-00	RESISTOR, 5K OHM	1		
25	S002-00077-00	RESISTOR, 5K OHM	1		
26	S002-00078-00	RESISTOR, 5K OHM	1		
27	S002-00079-00	RESISTOR, 5K OHM	1		
28	S002-00080-00	RESISTOR, 5K OHM	1		
29	S002-00081-00	RESISTOR, 5K OHM	1		
30	S002-00082-00	RESISTOR, 5K OHM	1		
31	S002-00083-00	RESISTOR, 5K OHM	1		
32	S002-00084-00	RESISTOR, 5K OHM	1		
33	S002-00085-00	RESISTOR, 5K OHM	1		
34	S002-00086-00	RESISTOR, 5K OHM	1		
35	S002-00087-00	RESISTOR, 5K OHM	1		
36	S002-00088-00	RESISTOR, 5K OHM	1		
37	S002-00089-00	RESISTOR, 5K OHM	1		
38	S002-00090-00	RESISTOR, 5K OHM	1		
39	S002-00091-00	RESISTOR, 5K OHM	1		
40	S002-00092-00	RESISTOR, 5K OHM	1		
41	S002-00093-00	RESISTOR, 5K OHM	1		
42	S002-00094-00	RESISTOR, 5K OHM	1		
43	S002-00095-00	RESISTOR, 5K OHM	1		
44	S002-00096-00	RESISTOR, 5K OHM	1		
45	S002-00097-00	RESISTOR, 5K OHM	1		
46	S002-00098-00	RESISTOR, 5K OHM	1		
47	S002-00099-00	RESISTOR, 5K OHM	1		
48	S002-00100-00	RESISTOR, 5K OHM	1		
49	03-7520	INSULATOR, NYLON	2		
50	03-7520	INSULATOR, NYLON	1		
51	5732-00110-00	FUSEHOLDER	10		



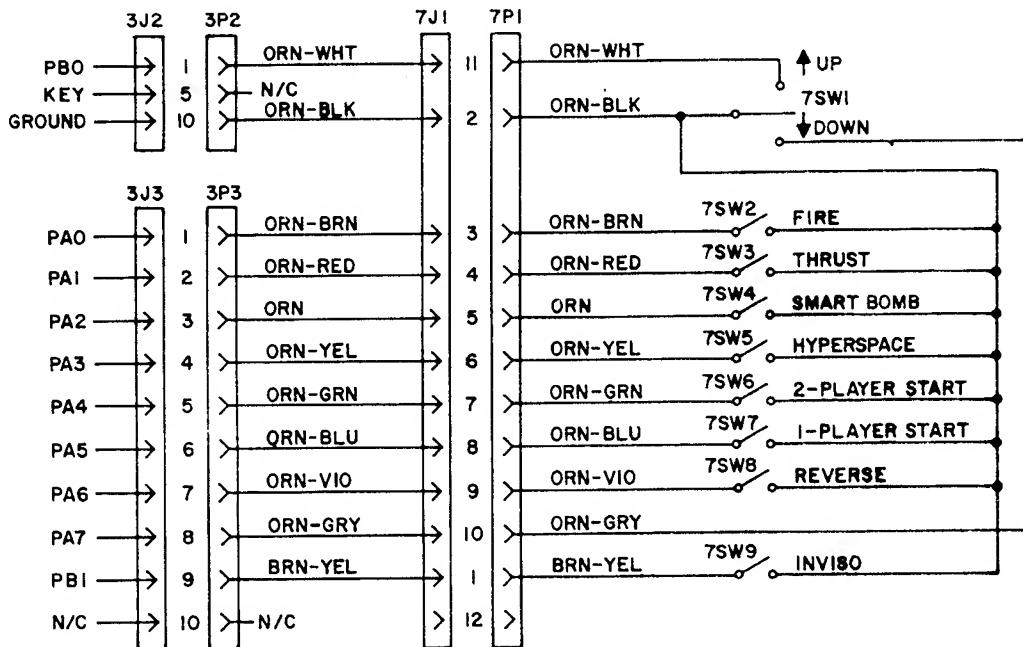
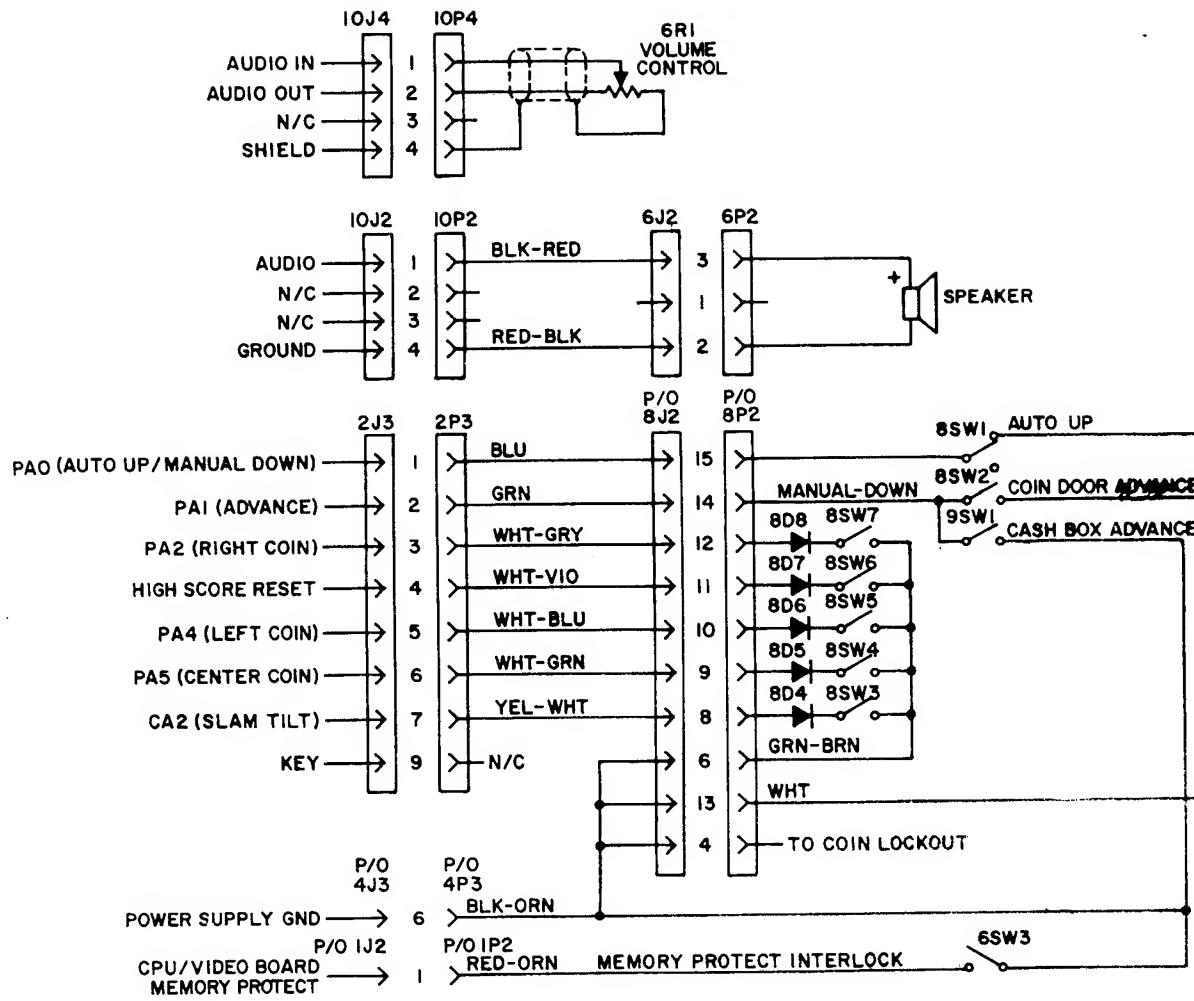
Power Supply Board Schematic Diagram and  
Overvoltage Protection Board

NOTE:  
 1. CONNECTED ONLY FOR OPERATIONAL APPLICATIONS.



NOTE: WHITE-RED JUMPERS SHOWN WITH SOLID LINES ON 8PI ARE FOR 117VAC OPERATION. FOR 220VAC OPERATION THESE JUMPERS ARE REMOVED AND THE JUMPER SHOWN WITH A DASHED LINE IS CONNECTED.

1. WH-T-RED JUMPERS SHOWN WITH SOLID LINES ON 8PI ARE FOR 117VAC OPERATION. FOR 220VAC OPERATION THESE JUMPERS ARE REMOVED AND THE JUMPER SHOWN WITH A DASHED LINE IS CONNECTED.



Cabinet Wiring Diagram

## BILL OF MATERIAL

ITEM NO.	PART NO.	PART DESIGNATION	DESCRIPTION	REQ'D NO.
1	01-2 01-146-6		BARE P.C. BOARD REV F	1
2	5370-09156-00	IC1	TDA 2002 V AUDIO AMPLIFIER	1
3	5280-09012-00	IC2	7442 BCD-DEC DECODER	1
4	5280-09073-00	IC3	7400 QUAD 2 INPUT NAND	1
5	5280-08973	IC4	7408 QUAD 2 INP. AND GATE	1
6	5310-09153-00	IC5	4050 BUFFER	1
7	5310-09154-00	IC6	4068 8 INPUT NAND GATE	1
8	5310-08971-00	IC7	4069 HEX INVERTER	1
9	5250-09157-00	IC8	7805 5 VOLT REG. W/TO 220 CASE	1
10	5430-08972-00	IC10	6821 P.I.A.	1
11	5340-09003-00	IC11	6810 RAM	1
12	5371-09152-00	IC13	1408 D/A CONVERTER	1
13	5160-08938-00	Q2, Q3, Q4	2N4401 NPN TRANSISTOR	3
14				
15	5075-09018-00	ZR1	IN5996A 6.8V ZENER DIODE	1
16				
17	5100-09357-00)	BR1	MDA 200/3N253	1
	5100-09158-00)		BRIDGE RECTIFIER	0
18	5520-09020-00	Y1	3.58 MHZ CRYSTAL	1
19	5010-08991-00	R1,R18,R19,R21,R22, R27,R30,R31, R32	RESISTOR, FC, 4.7K OHM, 5% 1/4 WATT	9
20	5010-09036-00	R2 thru R10	RESISTOR, FC, 100 OHM, 5% 1/4W	9
21	5010-09358-00	R12,R15,R28,R36,R38	RESISTOR, FC, 1K OHM, 5% 1/4W	5
22	5010-09181-00	R14	RESISTOR, FC, 1 OHM, 10% 1/2 WATT	1
23	5010-09161-00	R16	RESISTOR, FC, 2.2 OHM, 5% 1/4 WATT	1
24	5010-09361-00	R17	RESISTOR, FC, 220 OHM, 5% 1/2 WATT	1
25				
26	5010-08983-00	R23, R24, R26	RESISTOR, FC, 3.3K OHM, 5% 1/4 WATT	3
27	5010-09179-00	R25	RESISTOR, FC, 3.3M OHM, 5% 1/4 WATT	1
28	5010-09035-00	R29	RESISTOR, FC, 47K OHM, 5% 1/4 WATT	1
29	5010-09034-00	R33, R35, R37	RESISTOR, FC, 10K OHM, 5% 1/4 WATT	3
30	5010-09039-00	R34	RESISTOR, FC, 10 OHM, 5% 1/4 WATT	1
31	5043-08980-00	C1, C16 thru C23, C31	CAPACITOR, CER. .01 MFD. 50V. +80%, -20%	10
32	5043-09065-00	C2 thru C10	CAPACITOR, CER. 470 PFD. 50V. +20%	9
33	5043-09345-00	C11	CAPACITOR, CER. .001 MFD. +20% 100V.	1
34	5040-09365-00	C12, C30, C36	CAPACITOR, ELECT. 1 MFD. 63V. -10 +50%	3
35	5043-08996-00	C13, C24, C35	CAPACITOR, CER. .1 MFD. 50V. +20%	3
36	5040-09165-00	C14	CAPACITOR, ELECT. 1,000 MFD. 16V. +-20%	1
37	5040-09164-00	C15	CAPACITOR, ELECT. 470 MFD. 10V. +-20%	1
38	5040-08986-00	C25	CAPACITOR, ELECT. 100 MFD. 10V. +-20%	1
39	5040-08893-00	C26	CAPACITOR, ELECT. 1,000 MFD. 25V. +-20%	1
40	5040-09376-00	C27	CAPACITOR, ELECT. 4700 MFD. 16V. +-20%	1
41	5043-09180-00	C28	CAPACITOR, CER. 47 PFD. 1K V. +-20%	1
42	5040-09343-00	C29	CAPACITOR, ELECT. 10 MFD. 20V	1
43	5043-09169-00	C32, C33	CAPACITOR, CER. DISC. 27 PFD. 1KV. +-10%	2
44	5041-09163-00	C34	CAPACITOR, TANTALUM 2.2 MFD. 15V. +-20%	1
45	5041-09031-00	C37	CAPACITOR, TANTALUM 1 MFD. 25V. +-20%	1
46	5641-09658-00)	SW1	MOMENTARY SWITCH SPDT	1
47	5645-09330-00	DS1	2 STD, DIP SWITCH	1
48	5731-06314-00	F1, F2	4 AMP SLOW BLOW FUSE	2
49	5732-09178-00		FUSEHOLDER	4
50	5705-09172-00		HEAT SINK THERMALLOY #6072B	1
51	5705-09173-00		HEAT SINK THERMALLOY #6071B	1
52	5705-09199-00		HEAT SINK THERMALLOY #6030	1
53	5700-09004-00		24 PIN SOCKET	1
54	5700-08985-00		40 PIN SOCKET	1
55	5791-09027-00	10J1, 10J3	9 PIN MALE CONNECTOR 09-65-1091	2
56	5791-09028-00	10J2, 10J4	4 PIN MALE CONNECTOR 09-65-1041	2
57				
58	4006-01003-06		6-32x3/8" P-PH-S	3
59	4406-01117-00		6-32 HEX NUT	3
60	5010-09534-00		0 OHM RESISTOR	A/R
61	5824-09248-00	TP1 THR TP4	TERMINAL #1502-1	4
62	5010-09363-00	R11	RESISTOR, FC, 5.6K OHM 5% 1/4 WATT	1
63				
64	5019-09362-00	SR1	RESISTOR, 4.7K OHM 10 PIN SIP	1
65	03-7520-1		tie wrap	1
66	4703-00007-00		#6 EXT. LOCKWASHER	3
67	20-9229		Thermal Compound	.01

## NOTES:

1. USE THERMAL COMPOUND BETWEEN IC1 AND IC8, AND HEAT SINKS.

2. CAUTION: AVOID STATIC DISCHARGE DAMAGE TO MOS LOGIC.

3. SYMBOLS SHOWN ON COMPONENTS ARE FOR REFERENCE ONLY.

DO NOT SCREEN OR STAMP.

4. OBSERVE INDEX MARK OF ALL INTEGRATED CIRCUITS;

DIODES D1, D2, AND ZR1;

CAPACITORS C12, C14, C15, C25, C26, C27;

CONNECTORS 10J1, 10J2, 10J4, 10J3, 10J5;

POSITION OF TRANSISTORS Q1, Q2, Q3, Q4.

5. JUMPERS

W3) W2)

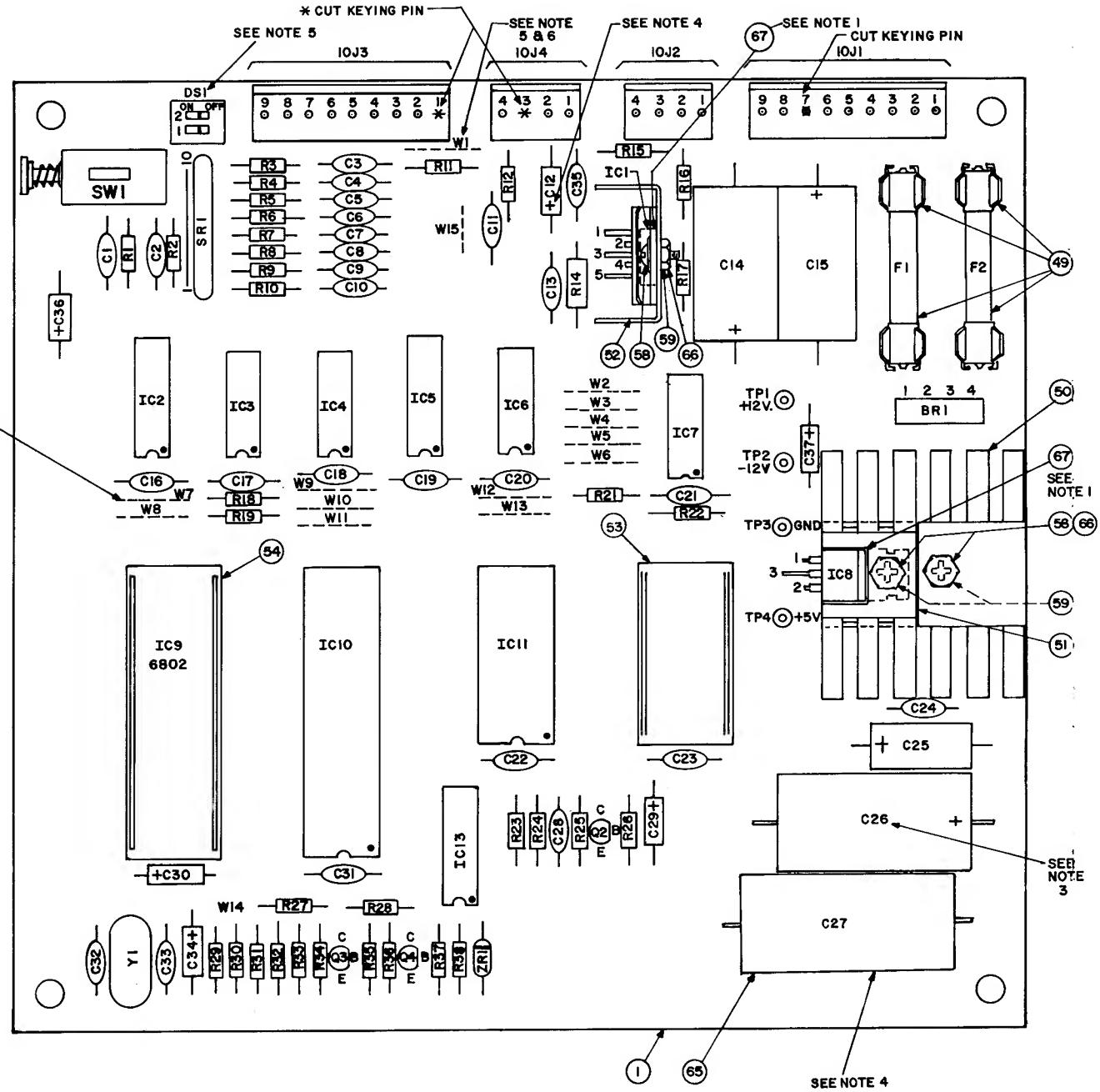
W4) W6)

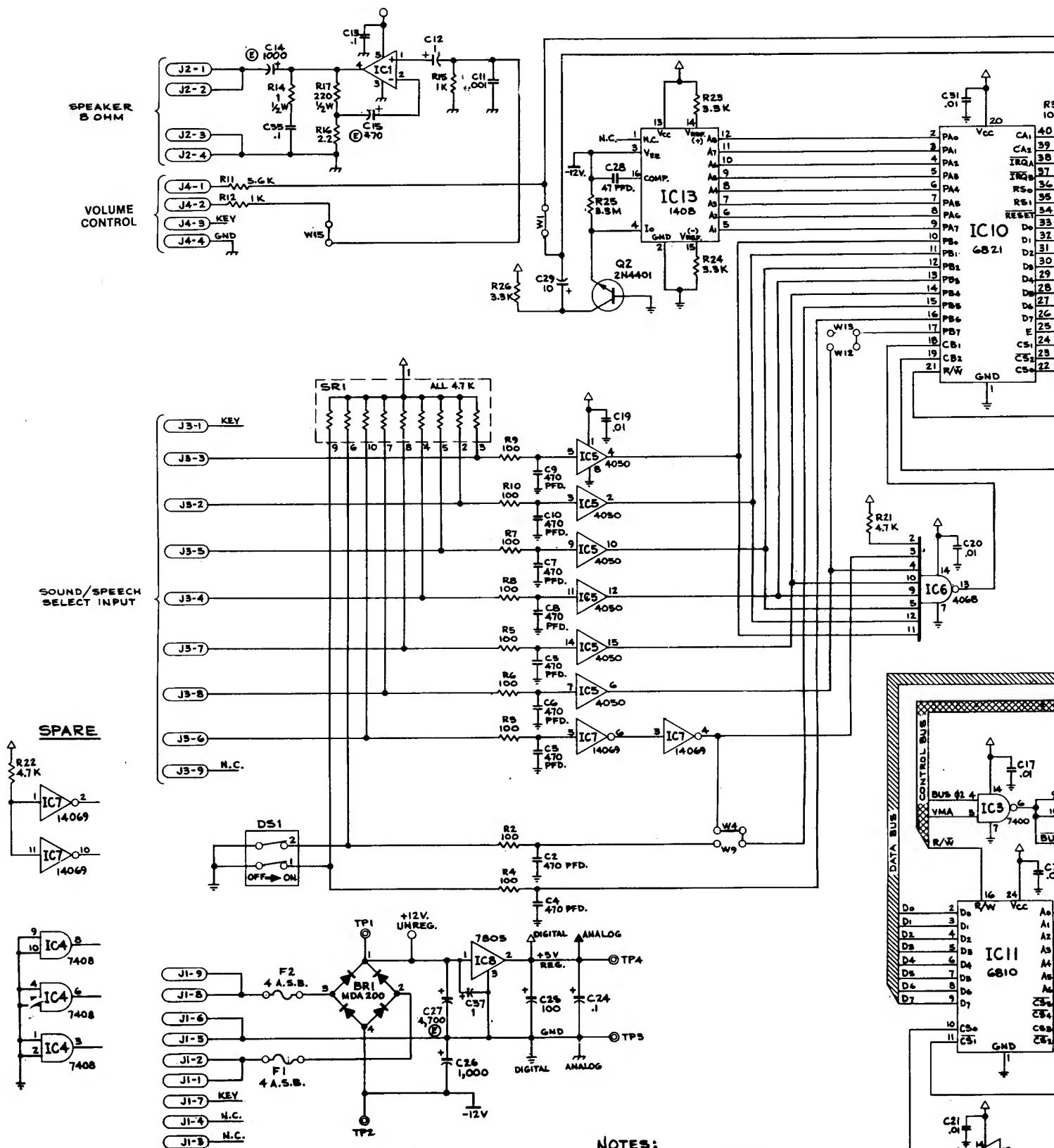
W5) IN W9) OUT

W10) W11)

W12)

W13)





#### NOTES:

1. ALL RESISTORS,  $\frac{1}{4}$  WATT UNLESS OTHERWISE NOTED.
2. ALL CAPACITORS, MFD. UNLESS OTHERWISE NOTED.

